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Poster Sessions

The production and role of hydrogen sulfide and hydrogen polysulfides in mammalian cells

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Accumulating evidence shows that hydrogen sulfide (H_2S) has physiological functions in various tissues and organs. It includes regulation of neuronal activity, vascular tension, a release of insulin, and protection of the heart, kidney, and brain from ischemic insult. H_2S is produced from L-cysteine by pyridoxal 5'-phosphate (PLP)-dependent enzymes, cystathionine beta-synthase (CBS) and cystathionine gamma-lyase (CSE). 3-Mercaptopyruvate sulfurtransferase (3MST) is the third H_2S -producing enzyme. 3-Mercaptopyruvate (3MP) is provided from L-cysteine and α -ketoglutarate by a PLP-dependent cysteine aminotransferase (CAT). An additional pathway for the production of H_2S from D-cysteine involving 3MST and D-amino acid oxidase (DAO) has been identified. Recently, hydrogen polysulfides (H_2S_n), which are oxidized forms of H_2S , have been found to stimulate transient receptor potential ankyrin1 (TRPA1) channel, much more potently than H_2S . H_2S_n is produced from 3MP by 3MST. In addition to the enzymatic production, the interaction between H_2S and nitric oxide (NO), another gaseous signaling molecule, also generates H_2S_n . These observations provide new insight into the production of these molecules and their mechanisms of physiological functions.